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ABSTRACT

Recognition of that segment of the population to whom higher education is inaccessible is leading many universities to consider the potential of initiating non-resident study programs. The characteristics of the delivery system implemented to transmit the instruction are of primary consideration in the design of such programs, since these characteristics interact in delimiting student population, instructional methods, and program goals. This paper investigates the feasibility of various kinds of instructional delivery systems, with specific reference to the effectiveness of four different systems currently being pilot-tested at the University of Pittsburgh. (Author)

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THE DEVELOPMENT OF AN INSTRUCTIONAL DELIVERY SYSTEM FOR EXTERNAL STUDIES IN HIGHER EDUCATION

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Background

The establishment of non-resident educational programs in higher education has been receiving an increasing amount of attention in an effort to meet the diverse educational needs of the American public. Although a number of prototype systems exist that provide such instruction, there have been few attempts in this country to develop non-resident educational systems that include both a flexible delivery mode and quality instruction. The primary requisites in the development of a non-resident educational program are: (1) that a delivery system be developed that has the characteristics of low cost, wide-area distribution and be available to the student on demand, (2) that the program insures that the content being transmitted is of high academic quality, (3) that the program provides for student motivation, and (4) that alternative learning modes be made available to accommodate individual student learning preferences.

The University External Studies Program (UESP) at the University of Pittsburgh began with the assumption that there existed, in Western Pennsylvania, certain individuals who had not been afforded access to higher educational opportunities. The purpose of the External Studies Program is to provide extended educational opportunities to those segments of the population that are currently denied access to undergraduate and graduate instruction because of geographical and situational factors. That is, there are at present a number of individuals who cannot avail themselves of the opportunity to pursue higher education because of such factors as commuting distance to and from an institution, family responsibilities, physical handicaps, and work situations such

as those entailing irregular schedules. In addition, there are individuals who wish to change positions or careers and desire to obtain new credentials or to further their education and yet must simultaneously maintain and support themselves or other individuals.

Central to the development of a program designed to meet these individual educational needs, is the specification of a delivery system for the dissemination of instruction. This delivery "system" consists of the instructional delivery model and the instructional support systems. The "instructional delivery model," then, refers to the curricular methods, mode, and media chosen for transmitting the course content. There is an interacting relationship between the characteristics of the instructional delivery system and the goals of the external program itself. That is, a number of specific assumptions are derived from the philosophy and goals of an external study program that act to limit and define the parameters of the delivery system itself.

1. The system must be flexible in terms of its accessibility and state of "readiness" or availability to the learner at any given point in time.

2. The system must permit the student to assume a great deal of independence and responsibility for pursuing specific learning goals.

3. The system must provide instruction that is adaptive to the individual needs of the learner.

Each of the delivery modes described below, combined with the support systems discussed later, constitute a separate type of delivery system that the UESP Program attempted to implement and examine.

It is within this context that the University External Studies Program recruited faculty members who, together with the Program staff, developed and offered five external studies courses which were the equivalent of on-campus courses and which represented four alternative instructional delivery modes. Each system served as one means for attempting to meet the diverse instructional needs of the UESP students. The Program was able to obtain background data for 121 of the 153 who enrolled in UESP courses during the initial offering. An analysis of this background information shows that these students

ranged in age from 19 to 55 and the majority did have employment or family responsibilities which prevented them from attending regularly scheduled on-campus classes. The reasons, as the students listed them, for preferring this type of study to traditional classes included the following: family responsibilities, work schedules, time conflicts with regular classes, and travel inconvenience. Less frequently mentioned were health and parking.

THE DELIVERY SYSTEMS

General Characteristics

One of the primary goals of this External Studies Program was to develop a system which was easily accessible to the student at any point in time. It was for this reason that written, self-instructional materials were chosen as the primary medium for the delivery of external studies courses to these students. Written materials have the advantages of being readily accessible to the student at any time and of being adaptable to the individual needs of the learner as well as to a wide variety of content. In addition, they are relatively inexpensive when compared to the other media and can be used independently from any other media.

For this Program, the individual faculty members were requested to develop self-instructional materials or to select from written materials already available in their field. They were assisted by curriculum specialists from the UESP staff and all materials were extensively reviewed before being distributed to the external studies students participating in the Program. The four types of delivery models developed are as follows:

1. Television with Supplementary Materials
2. Programmed Instruction with Supplementary Materials and Readings
3. Reading Lists with Summaries and Supplementary Materials
4. Structured Curriculum based upon a Process Model for the Individualization of Curricula

In addition to the curricular packages, based on each of the four delivery models, each system included the following supplemental support systems:

An Advisement-Counseling System. The function of this system was to provide the student with advisement and counseling personnel who could assist them with personal or professional counseling needs. The main portion of this service was provided through the staff of the School of General Studies which included personnel specifically trained for these purposes. In addition, the UESP system operated primarily in providing the following kinds of supportive assistance:

a. Information concerning UESP courses and the award of formal college credit.

b. Procedures for registration for UESP courses and assistance when special registration problems arose.

c. Assistance with difficulties in achieving course objectives and procedures for extending time limits to meet external pressures; encouragement when students encountered problems.

d. Providing a student manual containing information on how to study independently, as well as a map of the University indicating special resource areas and a list of courses to be offered the following term.

A Communications Support System. It was recognized by the UESP staff that since the student was primarily engaged in independent study, there was a pressing need to provide alternative ways by which the student would have access to the faculty and Program staff. The communications support system provided the student with the following means for communication:

a. Telephone communication - Students were given specific numbers to dial in order to reach the course instructors, the UESP staff, or specifically appointed teaching assistants who could assist them.

b. Student mailers - The students were provided with self-addressed forms which they could use for mailing in questions to the course instructor. There was space for the instructor response and students received an answer in as little time as possible.

c. Newsletter - Students received a newsletter four times during the term informing them of special dates and events which they should be aware of or which were relevant to their course interests.

d. Special memos - Special memos were prepared and mailed by the UESP staff when an instructor wished to make a special announcement to his students.

A telephone answering service, originally scheduled to be installed in time for the first term, was not delivered until the end of that term and had to be postponed for use in the following term.

Instructional Interaction Sessions. In order for students to be able to meet and interact with the course instructor and with the other students in the course, three interaction sessions were held during the term. These sessions were held on campus on designated Saturdays. The sessions were used primarily for lectures, group learning activities, formal testing, and to provide an opportunity for the student to ask questions and to get to know the other students. Program staff members assisted the instructors when necessary, serving as proctors or discussion leaders.

When a student could not attend one of these interaction sessions, as appointment was made with the instructor to enable the student to make up any test missed, and to provide him/her with relevant information discussed at the session. Special reports on the interaction sessions were sent to absentees.

Specific Characteristics of the Four Types of Instructional Delivery Models

Each of the four instructional packages had some type of written materials ranging from reading lists and summaries to highly-structured explicit learning modules. At the same time, each contained components that were unique. The following is a brief description of each delivery model and its packaging format. (See Table 1 for components of the various packages.)

Type I- Television with Supplementary Materials. One of the five initial courses, Law and Morality, was composed of televised lectures and presentations offered through the Sunrise Semester along with supplementary books and instructor-written lectures which were designed to assure that the student was presented with all the materials necessary in order for him to meet the course objectives.

Delivery Type	Course Guide						Unit Components										Evaluation		
	Introduction	Course rationale	Terminal objectives or goals	Study directions	Interaction schedule	Instructor Contact	Rationale	Learning Objectives	Prerequisite objectives	Hierarchy	Study Guide(s)	Test-like questions	Self-scored test items with answer key	Readings	Instructor-written overview or lecture	Self-scored posttest	Pretest	Other Exams	Posttest
TYPE I-Television with supplementary materials (Law and Morality)	x	x		v	x	x	x	x			x	v		x	x			1	1
TYPE II-Programmed Instruction with supplementary readings & materials (Economics)	v	x	x	v	x	x	x	x			x			x				2	1
TYPE III-Reading lists with summaries & supplementary materials (History)	x			v	x	x					x	x		x					1
TYPE IV-Structured materials based on PIC (Curriculum & Supervision)	x	v	x	x	x	x	x	v	x	x	x	x	x	x	x	x	1	x	1

TABLE 1

Packaging Format for each of the Four System Types

The student was presented with material initially designed to be supplementary to the televised presentations. During the design stages of the course, it was expected that the production center would forward detailed information concerning the topics and information to be presented on the televised lecture series, as this information had been requested during the initial stage of development. The information actually received, however, was less than adequate for use as a basis for the design and development of a well-organized course in Law and Morality and it was soon realized that the televised lectures would have to serve as supplemental content and that the instructor would have to develop and present materials which would provide the student with the information necessary for meeting the objectives of the course. The Sunrise Semester lectures did, however, provide the student with another frame of reference for the course and offered contact with the general content area.

Type II - Programmed Instruction with Supplementary Readings and Materials. A second type of delivery model, represented in the Introduction to Economics course, was based upon a programmed textbook with supplementary readings and materials. This supplementary reading consisted of a textbook which accompanied the programmed text. There were no instructor written lectures specifically designed to meet the stated course objectives.

This course depended almost entirely upon previously compiled textbooks and required a minimum of developmental time for the instructor since only a few instructor "handouts" were prepared. The instructor's greatest task, in this case, was to organize specific assignments and statements of objectives.

Type III - Reading Lists with Summaries & Supplementary Materials. A third type of model was pilot tested in a History course entitled "The Decline and Fall of Modern Europe," offered by the UESP Program. This course consisted of thirteen books which the students were required to read, plus instructor-written summaries and study questions. The answers to these questions were not mailed in by the students and were not self-graded so that students received very little feedback on their progress, other than that received at the interaction sessions, before being required to take the final examination.

Type IV - Structured Curricular Materials Based Upon a Process Model for the Individualization of Curricula. This course in Curriculum and Supervision was based upon a process model for the design and development of curriculum developed at the Learning Research and Development Center at the University of Pittsburgh. This is a highly developed research-based model representing a process for individualizing curricula through structured materials.

This is the most highly structured of the courses offered as it is based upon a specified model for curriculum development. It is very explicit in terms of student objectives and student procedures. The course provides a pretest for identifying the knowledge which the student may already have, and offers alternatives within the curriculum for meeting the individual goals of the student; for example, students are directed to certain readings if they are not interested in that particular area. The curriculum attempts, first, to provide the student with the knowledge and skills necessary for branching out into specific areas, and then to provide alternative content so that he can apply the knowledge and skills to his own field of interest. In addition, the student is provided with a means for evaluating his own progress through curriculum embedded testing for which answer keys or response criteria are provided which enable him to evaluate his own responses to the criterion referenced test items.

Comparing the Four Delivery Types

Although it is difficult to attempt to compare these different delivery models, since they are within different content areas and are designed and offered by different faculty members, one can examine the similarities or differences among the various types of presentation. As mentioned earlier, all four had a written instructional component. Type I incorporated another kind of medium--television. The major difference, however, among the various kinds of delivery was the degree of structure and specificity. While the History course, Type III, offered minimal structure in presenting the student with a book list and some general direction, the Curriculum and Supervision course presented the student with specific objectives and step-by-step procedures for achieving those objectives. The televised Law and Morality course and the programmed Economics course offered some degree of structure--more than the History course but less than the C&S course.

The only other major difference among the four instructional delivery models is the amount of self-evaluation provided for in the materials The C&S course, Type IV, contains self-scored curriculum embedded test items as well as self-scored posttests. None of the other courses presented the student with so much opportunity to evaluate his own progress throughout the course. The Law and Morality course, Type I, did require the student to mail in answers for case studies presented within the units, but these were faculty graded and served as a partial basis for the student's final grade.

Another means for comparing the courses might be to examine the student performance for each of the instructional delivery systems as a whole. (See Table 2 for student grades.)

TABLE 2

Final Grades for Four UESP Courses

Course	A	B	C	D	F	G*	Total
Law & Morality (Type I)	3	3	2	0	0	7	15
Economics (Type II)	6	13	1	0	0	1	21
History (Type III)	2	5	9	0	0	1	17
Curriculum & Supervision (Type IV)	10	4	3	0	0	8	25
TOTAL	21	25	15	0	0	17	78

*The "G" grade represents an incomplete grade and was administered by mutual agreement between student and instructor to allow the student additional time to complete the course work. This was an alternative to allow for student time flexibility based upon his individual needs and responsibilities.

Student Reaction

Generally, the student reaction to all four types of instructional delivery were positive, with all but one student (a History student) indicating that they would be interested in taking another UESP course if it were offered in their field of interest.

It can be noted that many of the students in the Type I, II, and III courses suggested the addition of components which would lend a greater

degree of structure and direction to these courses. Statements such as "Not knowing what points the instructor is stressing," "more sessions to help me correlate the ideas and information into a pattern," "I feel we need more direction," etc. indicate that these students were somewhat confused as to the direction in which they were supposed to progress with the materials. In courses which did not offer instructor-written materials (Type II especially) many students commented on the need for this type of communication. Since these students do not have the opportunity for classroom lectures, where they could pick up such things as instructor emphases and points of special interest, this information seems to be greatly appreciated within the course materials. These kinds of cues assist the student in identifying learning objectives and testing points and are in that sense an important learning aid.

Many of the students indicated that a major advantage to this type of study was that they could study when and where they wished and they always had the materials on hand for review when necessary. The Law and Morality (Type I) students, however, did not have this convenience with the televised lectures since they were presented only once and there was no alternative time schedule. This proved to be disturbing and inconvenient to some of the students as indicated by comments on their course evaluation sheets.*

Faculty Reaction

As a rule, the individual faculty members seemed confident that the students had met the course goals (implicit or explicit), although they recognized weaknesses within their own types of instructional delivery. The History professor, for example, noticed that his students seemed to request additional direction and at one point commented that he had been asked to hold an additional interaction session to assist the students. All of the faculty members seemed to recognize the value of some of the structured components for the packaged materials. They recognized that, for the external studies student, a certain amount of direction must be present within the materials since they are required to meet certain course goals.

*For purposes of program evaluation, the student was asked to fill out course rating sheets (2), as well as unit rating sheets and background information forms.

Resources

In examining these four alternative formats, it is necessary that attention be given to the management effort and costs expended in developing and offering each course. Although it is not possible to specify the "real" cost of each course, an assessment can be made which indicates the relative cost of each course in terms of UESP costs,faculty effort, commercial development cost and student costs. These relative costs are presented in Table 3.

TABLE 3

Relative Distribution of Costs by Course

Course	UESP	Faculty Effort	Commercial	Student Costs
Law & Morality (Type I)	Moderate	High	High	Low
Economics (Type 2)	Low	Low	Moderate	Low
History (Type 3)	Moderate	Moderate	High	High
Curriculum & Supervision (Type 4)	High	High	Low	Low

UESP costs refer to those costs that are associated with providing technical developmental assistance to the faculty, production costs, and the general administrative support required to coordinate and manage the course. Since the Curriculum Design course based on the structured-curriculum model involved the greatest volume of technical material, it required the greatest amount of UESP resources. At the other extreme, the utilization of commercially available programmed instructional materials and supplemental textbooks required only a minimal amount of UESP resources. The amount of faculty effort required to develop the individual courses corresponds to the same distribution as that of UESP costs. The structured-curriculum course required an extensive amount of faculty time equivalent to approximately four or five man months of development. Commercial development costs refer to the relative commercial cost that have to be expended to develop the materials. Naturally, the courses utilizing television and textbook supplements are very expensive because of the television production costs. Also, the course

requiring thirteen textbooks had high commercial development costs associated with it. These commercial development costs are important to recognize since, if such developmental costs were not assumed by another agency, they would have to be assumed by the Program. In some instances, this could be very prohibitive. Finally, it is important to consider the cost to the student in acquiring the necessary instructional materials. Since the structured-curriculum model, the programmed instruction, and television modes of presentation were either internally produced or else required only a limited number of commercially available materials, these student costs were relatively low. The lengthly reading list required by the History course resulted in about 50% more student costs.

In summary, based on the cost factors associated with the development of these materials, attention should be given, when possible, to the utilization of commercially developed materials, particularly of the programmed instruction mode. In terms of UESP, the structured-curriculum model has been selected as the primary format mode.

Summary

The advantages in flexibility and accessibility of written instructional materials was re-emphasized throughout this attempt to try the various types of instructional delivery systems, as were the limitations and possibilities of television as an instructional medium. A value, in terms of explicit student direction and student self-evaluation, was recognized in the highly-structured curriculum. It seems apparent throughout this study that written materials can provide the external studies student with the information needed for meeting the objectives of a course and that these materials can be supplemented with other media or can be used exclusively by the student. It was also recognized that, in order to address individual student needs and provide instructional alternatives to meet those needs, this Program should continue to experiment with various types of packaging and with various media.

It can be noted here that the structured-curriculum process (Type IV) is recognized to be extremely adaptable to this kind of experimentation since it provides a process for identifying student needs (in terms of a learning

hierarchy and structured pretest) as well as a process for identifying appropriate use of media based upon the characteristics of the student population, and the type of objective to be achieved. This kind of instructional delivery system, then, is seen to be extremely useful in maintaining student direction, specificity, and accessibility while at the same time allowing for the individuality and creativity of the instructor in attempting to make use of other media and methods in his course design.

Future Developments

Although the University External Studies Program has achieved some degree of success during its initial stage of operation, the staff of this Program feel that alternative instructional formats need to be considered in order to provide a comprehensive learning system that will most adequately meet the needs of its students. At the present time, the structured-curriculum model is viewed by the staff as having a high degree of potential for formatting the materials, however, the emphasis on paper/pencil presentation needs to be further examined.

In order to systematically examine additional delivery modes, two studies are currently under consideration. The first of these utilizes audio cassettes. Because audio cassettes are readily available at a reasonable cost, the use of them seems to be of some merit. The audio cassette would permit the student the option to hear a discussion representing various points of view about a given topic, to have faculty summaries prepared on given aspects of the course, or could be used as a communication device between faculty and students in terms of answering a student's specific questions. At the present time, audio cassettes are being considered as supplemental components of the instructional package and not as the primary program.

Another system also being considered is that of cable casting; that is, the use of broadcasting systems via a cable television network. On the assumption that the growth of this industry will continue at the same rate it has over the past five years, it appears that a network of cable stations could provide low cost distribution to a large number of households. This program would involve both the written materials already prepared by

UESP and cable casting. The instructional package would consist of a paper/pencil instructional workbook based on the structured-curriculum model, three interaction sessions per term, and fifteen one-hour television presentations per term. Each television presentation would be presented three times in a given day--once a week; morning, afternoon, and evening. Therefore, the student would have available three alternative instructional learning modes: the interaction sessions, the televised presentation, and the paper/pencil presentation. Cable casting would permit flexibility through offering three presentations of a given lesson at various times in the day and would provide a motivational factor in that there would be an implicit pacing for the student because of the scheduled television presentations. In addition, it would be possible to reach a larger number of individuals who cannot currently utilize present educational opportunities.

It is hoped that by systematically examining various types of alternative formats in instructional delivery systems, it will be possible to devise a comprehensive instructional system that can be utilized to meet the needs of non-resident students.